

WHAT IS CLAIMED IS:

1. An augmented reality presentation apparatus for superimposing a virtual object in a real space, characterized by comprising:

5 augmented reality presentation means for superimposing the virtual object viewed from a player's viewpoint position in the real space viewed from said player's viewpoint position;

10 the first video sensing means for sensing a video of the real space viewed from a first viewpoint position which differ from said player's viewpoint position;

15 the first video generation means for generating a video of the virtual object viewed from said first viewpoint position;

and

20 the first video composition means for compositing an augmented reality video viewed from said first viewpoint position on the basis of said videos of the real space and the virtual object viewed from said first viewpoint position.

25 2. The apparatus according to claim 1, characterized in that said augmented reality presentation means further comprises:

the second video sensing means for sensing a video of the real space viewed from said player's viewpoint position;

the second video generation means for generating  
5 a video of the virtual object viewed from said player's viewpoint position;

the second video composition means for  
compositing an augmented reality video viewed from said  
player's viewpoint position on the basis of said videos  
10 of the real space and the virtual object viewed from  
said player's viewpoint position;

and

the display means for displaying to the player  
the augmented reality video viewed from said player's  
15 viewpoint position.

3. The apparatus according to claim 1, characterized  
in that said augmented reality presentation means  
further comprises:

20 the second video generation means for generating  
a video of the virtual object viewed from said player's  
viewpoint position;

and

the display means for displaying to the player  
25 the video of the virtual object viewed from said  
player's viewpoint position on a display surface

through which the player can visually see the real space.

4. The apparatus according to claim 1, characterized  
5 by further comprising information generation means for generating information that pertains to rendering of the virtual object, and

in that said first video generation means and  
said second video generation means generate videos of  
10 the virtual object using the information that pertains to rendering of the virtual object.

5. The apparatus according to claim 4, characterized  
in that said information generation means generates  
15 information of an outer appearance of the virtual object and information of a position/posture of the virtual object as the information that pertains to rendering of the virtual object.

20 6. The apparatus according to claim 1, characterized in that parameters of said first video sensing means are known, and

said first video generation means generates the  
video of the virtual object viewed from said first  
25 viewpoint position in accordance with the known parameters.

7. The apparatus according to claim 1, characterized in that some of parameters of said first video sensing means are variable,

5            said apparatus further comprises measurement  
means for measuring changes of the parameters,  
and

10       said first video generation means generates the  
video of the virtual object viewed from said first  
viewpoint position in accordance with the parameters  
measured by said measurement means.

8. The apparatus according to claim 7,  
characterized in that the parameters of said first  
15 video sensing means measured by said measurement means  
include at least one of a viewpoint position/posture,  
and zoom ratio.

9. The apparatus according to claim 1, characterized  
20 in that when a plurality of first video sensing means  
equivalent to said first video sensing means are  
present,

25        said apparatus further comprises selection means  
for receiving a plurality of videos of the real space  
from said first viewpoint position from the plurality  
of first video sensing means, and outputting a video of

the real space viewed from said first viewpoint  
position input from one selected first video sensing  
means to said first video composition means, and

5        said first video composition means generates a  
video of the virtual object viewed from said first  
viewpoint position using parameters of the first video  
sensing means selected by said selection means.

10        10. An augmented reality presentation method for  
superimposing a virtual object in a real space,  
characterized by comprising:

15        augmented reality presentation step of  
superimposing the virtual object viewed from a player's  
viewpoint position in the real space viewed from said  
player's viewpoint position;

the first video sensing step of sensing a video  
of the real space viewed from a first viewpoint  
position which differ from said player's viewpoint  
position;

20        the first video generation step of generating a  
video of the virtual object viewed from said first  
viewpoint position;

and

25        the first video composition step of compositing  
an augmented reality video viewed from said first  
viewpoint position on the basis of said videos of the





15. The method according to claim 10, characterized in that parameters of means for sensing said first viewpoint video are known, and

5        said first video generation step includes the  
step of generating the video of the virtual object  
viewed from said first viewpoint position in accordance  
with the known parameters.

10 16. The method according to claim 10, characterized  
in that some of parameters of means for sensing a video  
viewed from said first viewpoint position are variable,

said method further comprises the measurement  
step of measuring changes of the parameters,

15      and

said first video generation step includes the step of generating the video of the virtual object viewed from said first viewpoint position in accordance with the parameters measured in the measurement step.

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17. The method according to claim 16, characterized in that the parameters of the means for sensing a video viewed from said first viewpoint position measured in the measurement step include at least one of a

25 viewpoint position/posture, and zoom ratio.



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18. The method according to claim 10, characterized  
in that when a plurality of means for sensing a video  
viewed from said first viewpoint position are present,  
said method further comprises the selection step  
5 of receiving a plurality of videos of the real space  
viewed from a first viewpoint position from the  
plurality of means for sensing a video viewed from said  
first viewpoint position, and outputting the video of  
the real space viewed from a first viewpoint position  
10 input from one selected means for sensing a video of  
said first viewpoint position to means for compositing  
a first viewpoint video, and

said first video composition step includes the  
step of generating a video of the virtual object viewed  
15 from said first viewpoint position using parameters of  
the means for sensing a video viewed from a first  
viewpoint position selected in the selection step.

19. A storage medium storing a program code for  
20 superimposing a virtual object in a real space when  
said program code is loaded by a computer,  
characterized by comprising:

a program code of the augmented reality  
presentation step of superimposing the virtual object  
25 viewed from a player's viewpoint position in the real  
space viewed from said player' viewpoint position;

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a program code of the first video sensing step of sensing a video of the real space viewed from a first viewpoint position which differ from said player's viewpoint position;

5           a program code of the first video generation step  
·   of generating a video of the virtual object viewed from  
   said first viewpoint position;

and

10 a program code of the first video composition  
step of compositing an augmented reality video viewed  
from said first viewpoint position on the basis of said  
videos of the real space and the virtual object viewed  
from said first viewpoint position.

15 20. The medium according to claim 19, characterized  
in that the program code of the augmented reality  
presentation step further comprises:

20 a program code of the second video sensing step  
of sensing a video of the real space viewed from said  
player's viewpoint position;

a program code of the second video generation step of generating a video of the virtual object viewed from said player's viewpoint position;

25 a program code of the second video composition  
step of compositing an augmented reality video viewed  
from said player's viewpoint position on the basis of

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said videos of the real space and the virtual object  
viewed from said player's viewpoint position;  
and

5 a program code of the display step of displaying  
to the player the augmented reality video viewed from  
said player's viewpoint position.

21. The medium according to claim 19, characterized  
in that the program code of the augmented reality  
10 presentation step further comprises:

a program code of the second video generation  
step of generating a video of the virtual object viewed  
from said player's viewpoint position;  
and

15 a program code of the display step of displaying  
to the player the video of the virtual object viewed  
from said player's viewpoint position on a display  
surface through which the player can visually see the  
real space.

20 22. The medium according to claim 19, characterized  
by further comprising a program code of the information  
generation step of generating information that pertains  
to rendering of the virtual object,

25 and

in that in the program codes of said first video generation step and said second video generation step, videos of the virtual object are generated using the information that pertains to rendering of the virtual object.

23. The medium according to claim 22, characterized in that the program code of said information generation step includes the step of generating information of an outer appearance of the virtual object and information of a position/posture of the virtual object as the information that pertains to rendering of the virtual object.

24. The medium according to claim 19, characterized in that parameters of means for sensing said first viewpoint video are known, and

the program code of said first video generation step includes the step of generating the video of the virtual object viewed from said first viewpoint position in accordance with the known parameters.

25. The medium according to claim 19, characterized in that some of parameters of means for sensing a video viewed from said first viewpoint position are variable,

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the program code of said medium further comprises the measurement step of measuring changes of the parameters,  
and

5        the program code of said first video generation step includes the step of generating the video of the virtual object viewed from said first viewpoint position in accordance with the parameters measured in the measurement step.

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26.    The medium according to claim 25, characterized in that the parameters of the means for sensing a video viewed from said first viewpoint position measured in the measurement step include at least one of a  
15    viewpoint position/posture, and zoom ratio.

27.    The medium according to claim 19, characterized in that when a plurality of means for sensing a video viewed from said first viewpoint position are present,

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      said medium further comprises a program code of the selection step of receiving a plurality of videos of the real space viewed from a first viewpoint position from the plurality of means for sensing a video viewed from said first viewpoint position, and  
25    outputting the video of the real space viewed from a first viewpoint position input from one selected means

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for sensing a video of said first viewpoint position to  
means for compositing a first viewpoint video, and

the program code of said first video composition  
step includes the step of generating a video of the  
5 virtual object viewed from said first viewpoint  
position using parameters of the means for sensing a  
video viewed from a first viewpoint position selected  
in the selection step.

10 28. The apparatus according to claim 1, characterized  
by further comprising printing means,

in that said first video composition means  
outputs the augmented reality video to said printing  
means,

15 said printing means grabs one frame of the  
received video and prints out to the paper as a still  
image.

20 29. The method according to claim 10, characterized  
by further comprising printing step,

in that in said first video composition step the  
augmented reality video is output to means for printing,

in said printing step one frame of the received  
video is grabbed and printed out to the paper as a  
25 still image.

